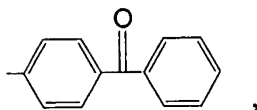
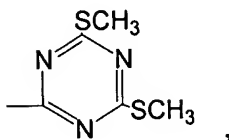
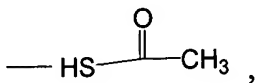


CLAIMS

1. A nucleotide comprising the structure:

Phosphate-Sugar-Nucleobase-Linker-F;

wherein F is a functional group selected from:



and ---NH-NH_2 .

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2. The nucleotide of claim 1 wherein said Linker is attached to said Nucleobase at the N-4 or C-5 position of said nucleobase when said nucleobase is a pyrimidine, or at the N-6, C-8 or C(N)-7 position of said nucleobase when said nucleobase is a purine.

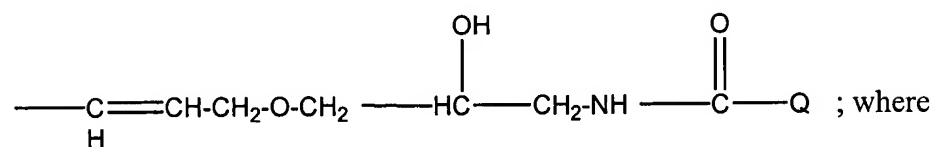
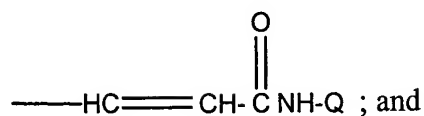
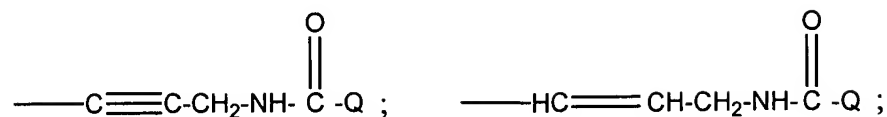
3. The nucleotide of claim 1 wherein said nucleobase is selected from the group consisting of: adenine, cytosine, guanine, thymine, uracil and hypoxanthine.

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4. The nucleotide of claim 1 wherein said linker is selected from the group consisting of:

$\text{---CH}_2\text{---(CH}_2\text{---CH}_2\text{)}_v\text{---CH}_2\text{---NHC(O)---Q---}$; $\text{---CH}_2\text{---(CH}_2\text{---CH}_2\text{)}_v\text{---CH}_2\text{---C(O)---NH---C(O)---Q---}$;

$\text{---S---CH}_2\text{C(O)---Q---}$; $\text{---S---CH}_2\text{CH}_2\text{NH---C(O)---Q---}$; $\text{---O---CH}_2\text{C(O)---Q---}$; $\text{---O---CH}_2\text{CH}_2\text{NH---C(O)---Q---}$;



- $v=0,1,2,3$, $\text{Q}=-\text{NH}(\text{CH}_2)_6\text{NH-}$, $-\text{NH}-(\text{CH}_2)_2\text{NH-}$, $-(\text{CH}_2)_5\text{NH-}$, $-(\text{CH}_2)_2\text{-C}(\text{O})\text{-NH}-(\text{CH}_2)_3\text{-O}-(\text{CH}_2)_2\text{-O}-(\text{CH}_2)_2\text{-O}-(\text{CH}_2)_3\text{-NH-}$, $-\text{NH}-[(\text{CH}_2)_2\text{-O-}]_w\text{-(CH}_2)_2\text{-NH-}$, $-(\text{CH}_2)_2\text{C}(\text{O})\text{-NH-}$
 5 $[(\text{CH}_2)_2\text{-O}]_w\text{-NH-}$, and $w=2,3,4,5$.

5. The nucleotide of claim 1 wherein said nucleotide is selected from the group consisting of ATP, dATP, ddATP, GTP, dGTP, ddGTP, CTP, dCTP, ddCTP, UTP, dUTP, TTP and ddTTP.
6. The nucleotide of claim 1 wherein said phosphate moiety is a mono-, di-, tri-, or
 10 tetraphosphate group.
7. The nucleotide of claim 1 wherein said sugar moiety is a cyclic pyranofuranose sugar.
8. The nucleotide of claim 7 wherein said cyclic pyranofuranose sugar is selected from the group consisting of ribofuranosyl, 2'-deoxyribofuranosyl, and 2', 3'-dideoxyribofuranosyl.
- 15 9. The nucleotide of claim 1 wherein said sugar moiety is a cyclic non-furanose sugar.
10. The nucleotide of claim 9 wherein said cyclic non-furanose sugar is selected from the group consisting of oxetan, pyran or oxadiazepine.
11. The nucleotide of claim 1 wherein said sugar moiety is an acyclic sugar analog.

12. The nucleotide of claim 11 wherein said acyclic sugar analog is selected from the group consisting of phosphonomethoxyethyl, 2-oxyethoxymethyl, 2-hydroxymethoxymethyl, and 3-pentenyl.
13. A method of labeling a nucleotide of claim 1, said method comprising contacting
5 said nucleotide with a detectable moiety comprising a reactive thiol group.
14. The method of claim 13 wherein said detectable moiety comprises a chromogenic dye, a fluorescent dye, a polypeptide or an enzyme.
15. A nucleotide labeled according to the method of claim 13.
16. A method of labeling a nucleic acid, said method comprising contacting said nucleic
10 acid with a nucleotide of claim 15.
17. The method of claim 16 wherein said contacting is performed in the presence of a nucleic acid polymerase.
18. A method of labeling a nucleic acid, said method comprising contacting said nucleic acid with a nucleotide of claim 1.
- 15 19. The method of claim 18 wherein said contacting is performed in the presence of a nucleic acid polymerase.
20. The method of claim 18 further comprising contacting said nucleotide with a thiol-containing detectable moiety.
21. The method of claim 20, wherein said thiol-containing detectable moiety is a
20 chromogenic moiety, a fluorescent dye, a polypeptide or an enzyme.
22. A polynucleotide comprising a nucleotide of claim 1.
23. A method of attaching a nucleic acid to a surface, said method comprising:

a) contacting said nucleic acid with a nucleotide of claim 1 in the presence of a nucleic acid polymerase, wherein said contacting results in the incorporation of said nucleotide into said nucleic acid or its complement;

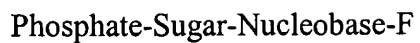
5 b) contacting the nucleic acid of step (a) with a surface comprising a reactive group complementary to the functional group F on said nucleotide, wherein said contacting results in covalent attachment of said nucleic acid of step (a) to said surface.

24. The method of claim 23 wherein said surface is a plate, tube, bead or column matrix.

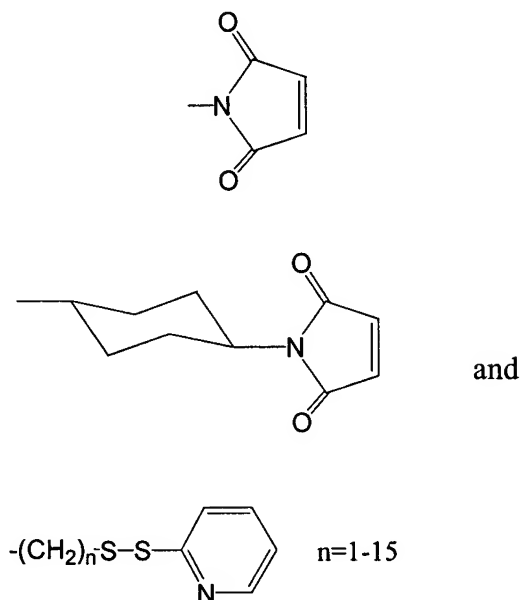
25. A kit comprising a nucleotide of claim 1.

10 26. The kit of claim 25, further comprising a nucleic acid polymerase, and packaging materials therefor.

27. A nucleotide comprising the structure:



wherein F is a functional group selected from:



5 wherein said sugar is an acyclic sugar analog.

28. The nucleotide of claim 27 wherein said acyclic sugar analog is selected from the group consisting of phosphonomethoxyethyl, 2-oxyethoxymethyl, 2-hydroxymethoxymethyl, and 3-pentenyl.

29. A polynucleotide comprising a nucleotide of claim 27.

10 30. A kit comprising a nucleotide of claim 27.

31. The kit of claim 30, further comprising a nucleic acid polymerase, and packaging materials therefor.